MARY-LOUISE PENRITH

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STUDIES ON THE SOUTH AFRICAN CLINIDAE. I. DESCRIPTION OF A NEW SPECIES OF *PAVOCLINUS*, AND REDESCRIPTION OF *GYNUTOCLINUS ROTUNDIFRONS* (BARNARD)

By

MARY-LOUISE PENRITH

South African Museum, Cape Town

(With 4 figures in the text and 1 plate)

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INTRODUCTION

During the course of a systematic and biological study of the South African fishes of the family Clinidae, extensive collecting has been carried out in the intertidal region of the south-western Cape coast.

In May 1963 two specimens of a clinid which could not be identified with any of the species known at present were collected with hand-nets from the dense beds of the green alga *Caulerpa filiformis* at Strandfontein, in False Bay. Eleven more specimens were subsequently collected from the same area, and recently a single specimen was collected at Onrus River mouth, near Hermanus.

The specimens were placed in the genus *Pavoclinus* Smith, 1945, on account of their lack of a supra-orbital tentacle, possession of a raised crest consisting of the first three dorsal spines, which is not separated from the rest of the fin by a notch in the membrane between the third and fourth dorsal spines, and their toothed vomer.

While collecting was being carried out in kelp-filled pools at the bottom of the intertidal zone at Lambert's Bay in January 1964, a male specimen of *Gynutoclinus rotundifrons* (Barnard, 1937) was caught. This species was previously known only from a single female specimen collected at Oudekraal in 1934 by the University of Cape Town. In March 1964 a juvenile specimen was collected from kelp in a gully at Lambert's Bay. A redescription of the species is desirable, since the holotype was not fresh by the time it was received by Dr. Barnard and the colouring had therefore completely disappeared, the male was unknown, and there are a few errors in the original description.

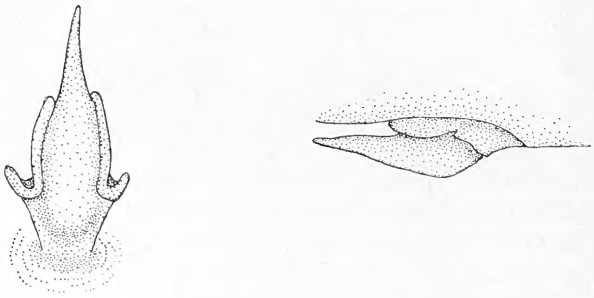
Ann. S. Afr. Mus. **48** (10), 1964: 211–217, 4 figs., 1 pl.

Pavoclinus litorafontis n. sp.
(Pl. V, figs. 1, 2)

(*litorafontis* from *Litus*, *-oris*: beach; *fons*, *-ntis*: fountain)

Material: (*a*) From *Caulerpa* beds in the intertidal zone, Strandfontein: S.A.M. 23876, 2 specimens, male and female, 91 mm., 110 mm.; S.A.M. 23877, 2 males, 102 mm., 175 mm.; S.A.M. 23952, 4 specimens, 1 male, 3 juveniles, 46–132 mm.; S.A.M. 23962, two juveniles, 41 mm., 43 mm.; S.A.M. 23972, one male, 136·5 mm.; S.A.M. 24052, one male, 164·5 mm. (holotype); (*b*) from an intertidal pool at Onrus River mouth, in *Bifurcariopsis brassicaeformis*; S.A.M. 24081, one female, 64 mm.

Description: D. XXIX–XXXIII 6–8; A. II 20–23; P. 12; V. I 3; C. 13. Depth 4·5–5·75; Head 3·75–5 in standard length; eye 3·5–4·25 in head. Upper jaw (from angle of jaw to snout tip) 33·5–41·5% of head length (2·4–3



(*a*) Ventral view. (*b*) Lateral view.

FIGURE 1. Intromittent organ of Pavoclinus litorafontis.

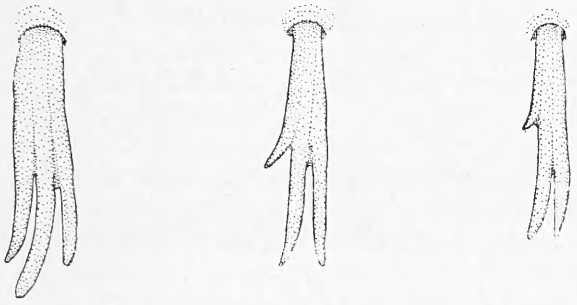
in head). Caudal peduncle length 58·5–75% of head length; caudal peduncle depth 22·5–33·5% of head length.

First three spines of dorsal fin elevated to form a crest, decreasing in relative height with increase in size of fish. Not even a shallow notch in membrane between third and fourth spines. Upper pectoral rays short, pectoral fin roughly elongate-ovate. Inner pelvic ray stout, equal to others. Caudal peduncle long. Caudal fin subtruncate.

Body somewhat elongate, compressed, covered with small imbricating scales. Snout bluntly conical. Eye rounded, protuberant, equal to snout. No supra-orbital tentacle. Nasal cirrus a small flap. Lips moderately thick.

Lateral line of minute double and alternating single pores to the post-pectoral curve in the line, thereafter of minute, non-alternating single pores. Intromittent organ of male with a large, conical tip and a very short basal portion; a single pair of fleshy crescentic lips ensheathing the lower part of the tip (fig. 1).

Colour: Mainly green, with darker green, yellow, and iridescent silver longitudinal stripes. Usually a longitudinal silver or yellow stripe across the cheek and operculum. Fins green, dorsal and anal sometimes with translucent patches, always translucent patches in the caudal fin. Underparts green. The colouring is often much like that of the specimen figured in Smith (1949), No. 1001 (middle), as one of the colour variations of *Pavoclinus heterodon* (C. & V.), but the specimen is shown with a short caudal peduncle and a reduced inner



(*a*) (*b*) (*c*)

FIGURE 2. Left pelvic fin of (*a*) Pavoclinus litorafontis, (*b*) Pavoclinus heterodon, (*c*) Pavoclinus pavo.

pelvic ray. It is common for species of this genus to have silvery or pearly markings, often arranged longitudinally.

Table 1. Fin counts and body proportions of the four species of *Pavoclinus*.

	litorafontis	*heterodon*	*pavo*	*profundus*
Dorsal spines	29–33	30–35	30–35	30
D. rays	6–8	4–6	2–4	4
A. rays	20–23	21–24	20–23	21
Head in S.L.	3·75–5	3·5–4·75	3·5–4·75	3·9
Depth	4·5–6	3·25–5	3·75–5	4·75
Upper jaw (% of head)	33·5–41·5	30–36	22–36·5	36
Caudal peduncle length (% of head) ..	58·5–75	26·5–38·5	40–46·5	36
1st d. spine (% of std. L.)	9–16·5	6·5–11	5·5–10·5	5·7
Eye in head	2·75–4·5	2·5–3·75	3–4	2·75

DISCUSSION

Only one specimen of *Pavoclinus profundus* was available for comparison, since this species is known only from the single specimen, taken in relatively deep water at Knysna (Smith, 1960). However, the specimen examined differs from *P. litorafontis* in a number of ways: *P. profundus* has a rather even dorsal fin, the first three spines not forming a crest; the inner pelvic ray is reduced; the caudal peduncle is short; there are fewer dorsal soft rays than in *P. litorafontis*.

For a comparison of the fin counts and body proportions of the four species of *Pavoclinus* see table 1.

Pavoclinus litorafontis differs from *P. heterodon* and *P. pavo* in that (i) the inner pelvic ray is not reduced, (ii) the caudal peduncle is very elongate, (iii) the dorsal soft rays are more numerous.

Pavoclinus heterodon and *P. pavo* both have the inner pelvic ray reduced to half or less than half the length and thickness of the other two rays (fig. 2), while in *P. litorafontis* all the specimens had the inner pelvic ray as stout as the other two and equal to them in length.

From table 1 it can be seen that the caudal peduncle of *P. litorafontis* is relatively considerably longer than that of *P. heterodon* or *P. pavo*. The caudal peduncle of *P. heterodon* is not elongate, the average caudal peduncle length for most of the South African Clinidae being about 25–35% of the head length. *P. pavo* has the caudal peduncle somewhat elongate, but in none of the specimens in the South African Museum collection did the caudal peduncle length approach that of *P. litorafontis*.

P. pavo has 2–4 dorsal soft rays, *P. heterodon* 4–6, and *P. litorafontis* 6–8 (see table 1), thus both *P. heterodon* and *P. litorafontis* may have 6 dorsal soft rays. However, by far the majority of the specimens of *P. heterodon* examined had 5 dorsal soft rays, while only one of the specimens of *P. litorafontis* had 6, so that there is little overlap between the two species in this respect.

P. litorafontis most closely resembles *P. heterodon* in that both are relatively large species with a bluntly conical snout, while *P. pavo* is a small species with an acutely pointed snout. *P. litorafontis* is more elongate and compressed than *P. heterodon*, and has a higher dorsal crest. This is particularly noticeable in the juvenile specimens of 40–60 mm., which in *P. litorafontis* have a high crest (12–16·5% of standard length), while the crest is lower in juvenile *P. heterodon* (7·5–10% of standard length). The differences in caudal peduncle length and in the development of the inner pelvic ray between these two species are particularly striking, and the specimens can almost invariably be separated by the soft dorsal ray count as well. Male and female specimens of *P. heterodon* of a similar size to the specimens of *P. litorafontis* were collected from the *Caulerpa* beds at Strandfontein at the same time and were clearly different from them in all the respects mentioned above, so that *P. litorafontis* cannot be regarded as a local or sexual variation or a geographical subspecies of *P. heterodon*.

It is rather unusual to find an undiscovered species of intertidal fish in a well-known area. However, no intensive collecting of Clinidae has been done in this area for many years, and probably none at Strandfontein, and as this species is well camouflaged, evidently fairly rare, and possibly restricted with regard to distribution, it is perhaps not surprising that it has only now come to light. Strandfontein is an extremely interesting area zoologically; during the present study another clinid, *Petraites brevicristatus*, previously known from only a few specimens, was found to occur in quite large numbers at Strandfontein, as well as the brotulid *Bidenichthys capensis*, also previously considered rare.

Gynutoclinus rotundifrons (Barnard, 1937)
(Figs. 3, 4)

Clinus rotundifrons Barnard, 1937: 63.
Gynutoclinus rotundifrons Smith, 1945: 358.

Material: S.A.M. 18587, one female, 83.5 mm., from kelp in an intertidal pool at Oudekraal, W. coast of Cape Peninsula (holotype); S.A.M. 24009, one male, 43·5 mm., from kelp, intertidal pool, Lambert's Bay; S.A.M. 24082, one juvenile male, 26 mm., from kelp, intertidal gully, Lambert's Bay.

Description: D. XXX–XXXII 8; A. II 22–23; P. 12–14; V. I 3; C. 13. Depth 3·8, 3·95 in larger specimens, 5·2 in juvenile. Head 3·7–4·15 in standard length; eye 3·5–4 in head. Upper jaw 42·5–54·5% of head length. Caudal peduncle length 28·6–36·4% of head length; caudal peduncle depth 28·6–32·2% of head length.

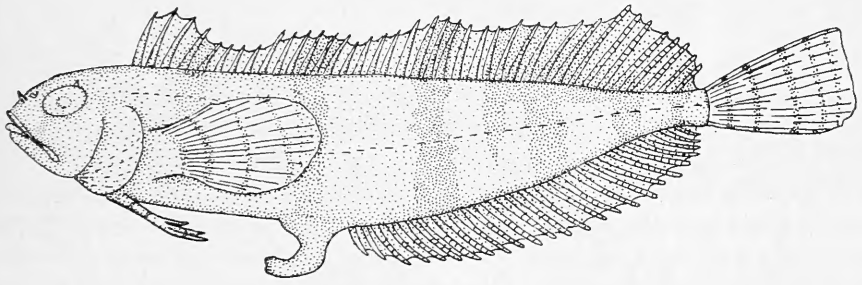


FIGURE 3. Gynutoclinus rotundifrons (Barnard), ♂, 43·5 mm. (Drawn as in life from specimen contorted on preservation).

First four dorsal spines slightly elevated, particularly in the two smaller specimens, to form a low, rounded crest, the second and third spines being the highest. Crest not separated from the rest of the fin by a notch in the membrane. Profile of dorsal fin undulating. Pectoral fin rounded. Inner pelvic ray reduced, not more than half of other two rays. Caudal peduncle short, about as broad as long. Caudal fin subtruncate.

Body compressed, not elongate, more so in the juvenile specimen than in the larger ones; covered with minute cycloid scales, not imbricating. Head spherical, inflated, broad, with mucus pores opening on conspicuous papillae. Eye rounded, somewhat protuberant. A minute, simple papilla over the eye. Anterior nostril tubular, nasal cirrus large, deeply bilobed. Posterior nostril conspicuous, surrounded by short, skinny flaps. Mouth rather large. Vomer toothed. Lips very thin.

Lateral line of single, non-alternating pores throughout, obsolete posteriorly in the holotype, but distinct on the caudal peduncle in the smaller specimens. Intromittent organ of male with a long basal portion and a club-shaped

tip, ensheathed at the tip by a pair of thin, crescentic lateral lips and a minute pair of more or less confluent dorsal lips (fig. 4).

Colour: (*a*) Male, 43·5 mm. Ground colour pale brown with about seven darker brown irregular cross-bars, edged with iridescent blue in fine broken lines. A very dark brown narrow vertical line behind and above the pectoral axil, and another at the end of the caudal peduncle. Cross-bars of body continued on to the dorsal fin, with translucent patches between them; translucent areas with fine black dots. Dorsal fin uniformly dark brown posteriorly; a

(*a*) Ventral view. (*b*) Lateral view.

FIGURE 4. Intromittent organ of Gynutoclinus rotundifrons.

single small translucent patch at the base near beginning of dorsal soft rays. Caudal fin translucent with very faint brown cross-bars, darkening at the margins. Pectoral fin translucent with four very fine dark brown cross-bars, the proximal one curved. Anal fin mainly dark brown, with two translucent patches near the base. Pelvic fins light brown with dark brown cross-bars. Head mainly light brown below. A dark brown stripe from the eye forwards in front of cheek to angle of jaw. Head above and opercular region deep pink. Snout pink with a darker pink bar between the eyes and another above the upper lip, a fine darker pink line down the middle. Eye silvery with golden-brown radii. Chin and lips light brown mottled heavily with darker brown. Branchiostegal membranes and jugular region silvery grey with fine black speckling. Belly silvery with a golden-brown sheen. Intromittent organ of male greyish, with fine black speckling.

(*b*) Juvenile, 26 mm. Whole body and head yellow, without cross-bars or markings, underparts lighter yellow. Dorsal fin with alternating pink and translucent patches. Anal fin yellow. Caudal and pectoral fins translucent. Pelvic fins yellow with brown cross-bars.

DISCUSSION

Neither Barnard (1937) nor Smith (1945) noticed the supra-orbital papilla. This is not surprising, as it is very small, and in the holotype had

shrunk owing to desiccation in the preservative; in life it is erect and quite distinct even to the naked eye. None of the other South African Clinidae described have a simple supra-orbital papilla; either there is a multifid supra-orbital tentacle, or a supra-orbital outgrowth is completely lacking.

Gynutoclinus rotundifrons is apparently a weed-dwelling species, as all three specimens so far found were taken from amongst fronds of kelp. It is the only species which has not been recorded east of Cape Point, but if it is as rare as it appears to be, it is possibly more widely distributed.

Acknowledgements

Acknowledgement must be made to Dr. F. H. Talbot of the South African Museum for advice and help; to Professor J. L. B. Smith of the Department of Ichthyology, Rhodes University, for the loan of the unique specimen of *Pavoclinus profundus*; to my husband Mr. M. J. Penrith of the South African Museum, who collected most of the specimens studied, and to Mr. C. Berrisford for the Onrus River mouth specimen.

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Summary

A new species of clinid, *Pavoclinus litorafontis* (Pisces: Clinidae), is described. *Gynutoclinus rotundifrons* (Barnard), previously known only from a unique specimen, is redescribed.

References

Barnard, K. H. 1937. Further notes on South African Marine Fishes. *Ann. S. Afr. Mus.* **32** (2): 41–67.

Smith, J. L. B. 1945. The fishes of the family Clinidae in South Africa. *Ann. Mag. nat. Hist.* (11) **12**: 535–546.

Smith, J. L. B. 1949. *The sea fishes of Southern Africa.* Central News Agency Ltd., South Africa.

Smith, J. L. B. 1960. A new species of South African clinid fish. *Ann. Mag. nat. Hist.* (13) **3**: 689–691.

Pavoclinus litorafontis n. sp.
The membrane between the dorsal spines and rays is continuous throughout the length of the fin, although in this plate the unpigmented areas are not visible (photograph: M. J. Penrith).

INSTRUCTIONS TO AUTHORS

MANUSCRIPTS

In duplicate (one set of illustrations), type-written, double spaced with good margins, including TABLE OF CONTENTS and SUMMARY. Position of text-figures and tables must be indicated.

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So proportioned that when reduced they will occupy not more than $4\frac{3}{4}$ in. × 7 in. ($7\frac{1}{2}$ in. including the caption). A scale (metric) must appear with all photographs.

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SMITH, C. D. 1954. South African Plonias. *In* Brown, X. Y. *Marine faunas.* 2nd ed. **3**: 63–95. London: Green.

SYNONYMY

Arranged according to chronology of names. Published scientific names by which a species has been previously designated (subsequent to 1758) are listed in chronological order, with abbreviated bibliographic references to descriptions or citations following in chronological order after each name. Full references must be given at the end of the paper. Articles and recommendations of the *International code of zoological nomenclature adopted by the XV International congress of zoology, London, July* 1958, are to be observed (particularly articles 22 and 51).

Examples: *Plonia capensis* Smith, 1954: 86, pl. 27, fig. 3. Green, 1955: 23, fig. 2.

When transferred to another genus:
Euplonia capensis (Smith) Brown, 1955: 259.
When misidentified as another species:
Plonia natalensis (*non* West), Jones, 1956: 18.
When another species has been called by the same name:
[*non*] *Plonia capensis*: Jones, 1957: 27 (= *natalensis* West).